DOCUMENT RESUME

ED 222 171 IR 010 404

AUTHOR Sarenpa, Dennis E.
TITLE Computer-Based Education Project Management.
PUB DATE May 82
NOTE 13p.; Paper presented at the Annual Convention of the Association for Educational Communications and Technology (Dallas, TX, May 1982).

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *College Faculty; *Computer Programs; Educational Media; Higher Education; Instructional Design; Microcomputers; *Program Administration; Programing; Publishing Industry; *Teamwork
IDENTIFIERS Editors; *Electronic Publishing

ABSTRACT

In this paper a rationale is presented for the formation of teams of college faculty (subject experts), computer programmers, and instructional designers to develop instructional software for use with classroom and laboratory microcomputers. The advent of an "electronic publishing" industry, one of the major products of which is educational computer programs, is described. The appeal to young college faculty members of electronic publication of educational software as an alternative to conventional publication is also discussed. Emphasis is placed upon the role of management in the success of instructional software development projects. The chief functions of development team members are outlined; the reasons for careful management of the team are analyzed; the expectations of electronic publishers in relation to software development teams are summarized; and the questions a project manager should ask of an electronic publisher are listed. Some of the pitfalls to be avoided in the management of development efforts are also discussed. (JL)

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ED222171

COMPUTER BASED EDUCATION PROJECT MANAGEMENT

A PAPER PRESENTED AT THE ANNUAL MEETING

OF

THE ASSOCIATION FOR EDUCATION AND COMMUNICATIONS TECHNOLOGY

DIVISION OF INSTRUCTIONAL DEVELOPMENT

MAY, 1982

DENNIS E. SARENPA

IR010404

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Computer Based Education Project Management

It is commonly believed that higher education is in a crisis. Evidence of the crisis is taking many forms, one of which is a fiscal crisis. One outcome of fiscal crisis is the cutback of funds for faculty and staff. University administrators are exercising creativity like never before in searching for funds to provide for an adequate support for faculty and staff. The purpose of this paper is to suggest that university administrators look seriously at encouraging the capability for developing the products of electronic publishing - commercially published computer prog rams.

For many years faculty have been encouraged to publish in scholary journals. The practice of "publish or perish" has been the downfall for many promising young faculty who value teaching as opposed to publishing. The advent of modern electronic publishing has opened new avenues for the faculty member who has a love for teaching yet has a need to publish. But before we go any further, what is electonic publishing? It is most easily defined by its typical product - the computer programs available through the growing number of "computer stores", usually in the form of "floppy disks" which are used with the small business or personal computers. The major book publishers are now

becoming active in electronic publishing. Major book publishers who have been in the business of publishing textbooks and journals for many years are actively getting into the electronic publishing market by producing and selling instructional and other computer programs.

Computer programs are the most common products of the electronic publisher - and there is a growing market for these products. The growing number of small business and personal computers available today is dramatically different than just a few year ago. But, it isn't just the businessman and the hobbyist that purchases the computer programs in the form of disks. Educators in large numbers are eagerly searching for good quality instructional programs for use in the classroom and laboratory. The micro computers found in many classrooms are frequently underused because of a lack of good instructional programs.

So in comes the eager young professor who has a need and desire to publish and who also has a love for teaching. Combined with subject matter expertise we seem to have the right combination of skills which would result in quality instructional programs for educators. Right? Wrong!

Oh, for sure these skills and capabilities are important - even essential. What is lacking are the skills unique to the production of quality instructional programs. Certainly the publishers are capable of providing the expertise necessary to help the university professor produce quality

instructional programs, after all, haven't publishers provided editors to work with authors throughout the years? Well my friends, it isn't the same ball game any more! Like so many other things, the life of the author is becoming more complex. It takes more than an editor working with the author. Computer programs for instructional purposes, that is, if they are good, are extremely complex. Perhaps not from the aspect of the subject matter content, but are from the aspect of good instructional design. It just isn't easy, ask anyone who has tried it. But, don't give up, because the skills can be attained, and the rewards are great. Where do we begin?

First of all it is important to secure the services of a good computer programmer who is sensitive to the unique requirements of instructional programming. The programmer must also be able to commuunicte well with the professor and an instructional designer. This team - the programmer, the professor (i.e. subject matter expert), and designer should be capable to produce quality - and marketable instructional programs. They should. However, an element frequently left out of the formula is the element of management. Good management of the skills and resources necessary for the production of instructional programs for the electronic publishing industry can make for a success. But what are the management skills and tasks necessary for the production of computer instructional

programs? The list can go on and on, but must include the following at a minimum:

(1) Keep team members working together smoothly. Projects usually involve team efforts because of the variety of capabilities required. There may be a need for more people than those mentioned - the professor/subject matter expert, the instructional designer, and the programmer. A project may need skilled personnel in the following areas: learning theory, writing and editing, and evaluation. Seldom will any one person be capable in all the necessary areas. It is a management function to ensure that the involved persons work together as a team toward the desired goals.

(2) Meet the publisher's needs. Projects that are designed and developed result from the needs of the publisher or client. Relationships between the publisher or client and the development team members must be established and maintained. The team leader - or manager - is often the key person in developing these relationships. It is a management function to maintain communication between the two groups and to ensure that the needs of the client are being met.

(3) Manage to project constraints. Projects are always limited by the realities of time, space, and available resources. These factors play an important role in planning the project and making the decisions necessary to keep the project going. The project manager must be aware of the

factors that limit the scope of the project. It is a management function to ensure that the work continues within constraints.

(4) Manage to meet project objectives. The project objectives are a description of what should occur in the design and development processes. They describe the task given to the development team in terms of the product expected, the process to be followed, the expectations of quality, costs and time. It is a management function to see that the project objectives are met within the constraints of the project.

Many wonder why a mangement system is necessary at all. They may feel that as long as people with proper knowledge and experience are assigned to work on a project, they should be left alone to do their work. It is sometimes thought sufficient to assign personnel to a project without much conern for a system to manage their work. Lack of a management system can, however, result in any or all of the following problems:

- Overlaps or gaps in the material. A managment system allows work to be divided in the most efficient way.
- Failure to meet project objectives. A management system assures that project work contributes to the completion of project goals.

- Inefficient use of resources. A managment system keeps uncertainties and changes in the project environment from directly interfering with the work of the project staff. Changes in the project environment may include changes in funding, project objectives, personnel changes and time requirement.
- Poor communication between the publisher and the development group. Assigning one manager responsibility for the development of the project provides a focal point of contact for the publisher.
- Inaccurate cost or time estimates. Without project management, the coordination of resources toward the completion of a project goal is a haphazzard matter.

The publisher will have certain expectations of the university development group. The electronic publisher can be expected to seek answers to the following questions:

- Is the project manager sensitive to cost and schedule?
- Does the project team have a development process that can be managed and do they have experience in doing so?
- Does the project manager have the support from the university administration?
- Is the project manager capable of attracting, training and retaining a project team?

- Is the project manager sensitive to and recognize quality? Does the project manager have access to good formative evaluation specialists?
- Does the project manager have a management process with realistic expectations from the development team and sensitivity to time and cost constraints?

The project manager must also have expectations and seek answers to the following questions:

- Is the publisher explicit in the expectations of the project? Are the time, cost and quality expectations clear? What are the provisions for renegotiation?
- What are the reports expected by the publisher? How frequent and what content?
- What are the deliverables of the project? Just what is the publisher expecting to be delivered as a result of the project?
- What are the provisions for payment? At stages of the project? At the completion? Is there an advance against future royalties? What is the royalty? What rights does the author have after publication?
- What responsiblity does the author organization have for product revision and maintenance?

There is potential for an attractive and rewarding relationship between the electronic publisher and the university. The traditional relationships are complicated

by the complexity of the medium and by the new roles that are frequently unknown or misunderstood by both parties. Pitfalls await the parties inexperienced in producing materials for the electronic publisher. A few suggestions to avoid some of these pitfalls are:

- There is a misunderstanding of costs. What costs are included? How much does it cost to do a specific task?
- An unclear contract is the downfall of many a project. Make sure that both parties fully understand what is to be delivered as a result of the project. Ensure that there is a provision for renegotition for the unexpected changes or problems that may occur.
- Don't expect to meet the schedule of development demonstrated by an experienced development team who has a successful track record.
- If you have a development process that works, don't deviate without careful consideration of the consequences of that deviation.
- Ensure that there is a close working relationship between the author/subject matter expert and the rest of the development team. Ensure that there is adequate time for meetings and that all parties are accessable.
- Be certain that you work out a mutually agreeable schedule with all parties. Ensure that milestones and deliverables are clearly understood.

- The development team and the publisher should minimize the number of people who interface between the two groups during the duration of the project.
- Be certain to allow for sufficient reviews of the materials at different stages of development. These reviews are to be for style, strategy and content.
- Allow for time for mailing and communications between the development team and the publisher.
- Ask for and carefully study an example of a product of same type and complexity level of the product you are contracting to produce.
- Have a clear understanding of the author's and development team's responsibilities after development is completed. Maintenance may be a major factor, don't forget it, for it can haunt you later.
- Don't overestimate the capabilities of the development team. Don't ruin the relationship with broken unrealistic promises.
- Have an understanding with the subject matter expert such that materials can be reviewed by another subject matter expert and that there is provision for resolution of differences.
- Don't be afraid to manage; slipped schedules and poor quality have a habit of getting out of hand.
- Never assume a person is a good writer without evidence. A good editor is worth three poor writers!

Project management is an essential element in any development project. Its importance is underscored in the development of products for the electronic publishing industry. There are many pitfalls awaiting the unsuspecting and inexperienced author or development team. One must not assume that management will "take care of itself" and that problems, once they occur, will simply go away. Project management skills can be learned in a variety of ways; the method of study and careful application is far superior to trial and error which may lead to no second chance.

The Author: Dr. Dennis E. Sarenpa is the manager of Professional Services Technical Training for Control Data Corporation in Minneapolis, Minnesota. He has extensive experience in working with the development of computer based education courseware, much of which was done in a contractal mode with several universities and small business development organizations. He also has ten years of experience as a teacher, instructional developer and faculty consultant at a state university.